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TM-1003 005 00

Milestone 11

Prepare Bird Buffer System Tape (SPST)

10 Mar 1966

TECHNICAL MEMORANDUM

(TM Series)

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Milestone 11	SYSTEM
Prepare Bird Buffer System Tape (SPST)	DEVELOPMENT
By	CORPORATION
R. C. Wise	2500 COLORADO AVE.
10 March 1963	SANTA MONICA
Approved	CALIFORNIA
J. B. Munson	

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IDENTIFICATION

- A. Title: Prepare Bird Buffer System Tape (SPST) - Ident 06C, Mod AD
- B. Author: R. C. Wise, System Development Corporation
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PURPOSE

The Prepare System Tape program (SPST) will initially generate a Bird Buffer System tape from a specially formatted input deck, or subsequently edit any part of an existing system tape.

USAGE

A. Operating Procedures

1. Mount tapes as follows:

- Tape 1; Existing Master (optional)
- Tape 2; Blank
- Tape 3; Prestore Corrections (optional)

2. Load SPST

SPST occupies 100_g to 2700_g in bank 1.

3. Set Jump Keys (see "F", Jump Key Settings)

SPST will halt at 100_g, make proper key settings and press start.

4. Start SPST

5. Successful Halt

SPST will halt at location 557_g.

B. On-Line Messages

All messages are typed on the on-line typewriter. If the input deck is from the prestore tape, any message will be followed by "UNRECOVERABLE ERROR". With input from the card reader, correct the card in error and continue by depressing the RUN switch.

The messages are as follows:

1. ERROR ON CODED CARD
2. ERROR ON BINARY CARD
3. SYMBOLIC TAG NOT IN SYMBOL TABLE
4. READ ERROR ON PRESTORE TAPE
5. INPUT OUT OF ORDER
6. CARD READER NOT READY

C. Program Stops

<u>Location</u>	<u>Operation</u>
101 ₈	Set jump keys and RUN.
557 ₈	Successful halt.
1640 ₈	Correct card in error and RUN.
1650 ₈	Unrecoverable error.

D. Tape Assignments

1. Unit 1 - Existing Bird Buffer System Tape.
2. Unit 2 - New Bird Buffer System tape.
3. Unit 3 - Prestore input.

E. Input/Output Formats

See Appendices

F. Jump Key Settings

1. Jump key 4
Set: Use existing master tape.
Not set: Do not use existing master.

2. Jump key 2

Set: Input from 167 card reader.

Not set: Input from 163 unit 3.

3. Stop Key 1

Set for debugging halts only.

OPERATING DESCRIPTION

SPST is loaded into bank 1 from a bi-octal paper tape, or from a binary deck by the loader. SPST rewinds its input tapes and after sensing jump key 2, sets its input switch to read either from the card reader (167-2) or tape 3. A symbolic card is read from the input source; the card must either be an END card or a BANK card. If an END card is read, the new Master tape will have an end of file written on it; it will be rewound, and parity-checked. If a BANK card is read, SPST will check the bank number against the position of the new master. If the inputs are not in sequence, SPST will attempt to align the sequence by copying the old Master to the new Master (if there is an old Master). If the input is in sequence, binary cards will be read from the input source until a binary transfer card is encountered. After reading the binary transfer card, coded correctors will be read until a coded transfer card is encountered. The bank is then written on the new Master tape. This processing loop continues until the END card is read.

RESTRICTIONS**A. Minimum Hardware**

1. One 160A/169
2. One 163-4 tape adaptor or one 163-2 tape adaptor and 167-2 card reader.
3. One 161 typewriter.

B. Input Format

The bank cards must be in ascending sequence, and all banks must be present if there is no existing tape. For each bank block present, there must be present a binary and a coded transfer card even if there is no binary, or coded information.

TIMING

The timing of SPST is a function of the number of cards in the input deck plus twice the time required to write four 4000 word records on a 163 tape.

Approximate time required to make a Bird Buffer System tape is 4 minutes.

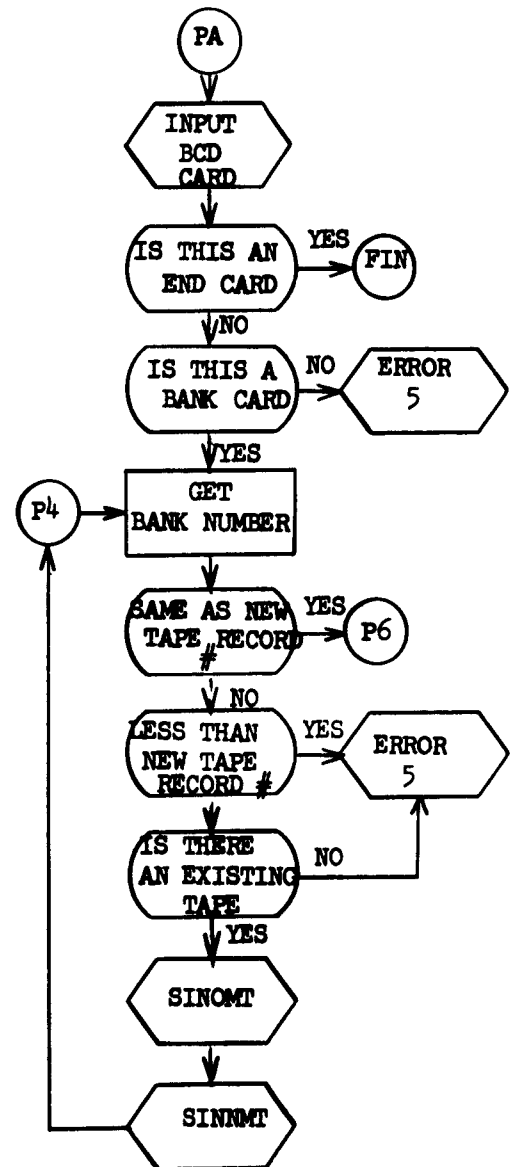
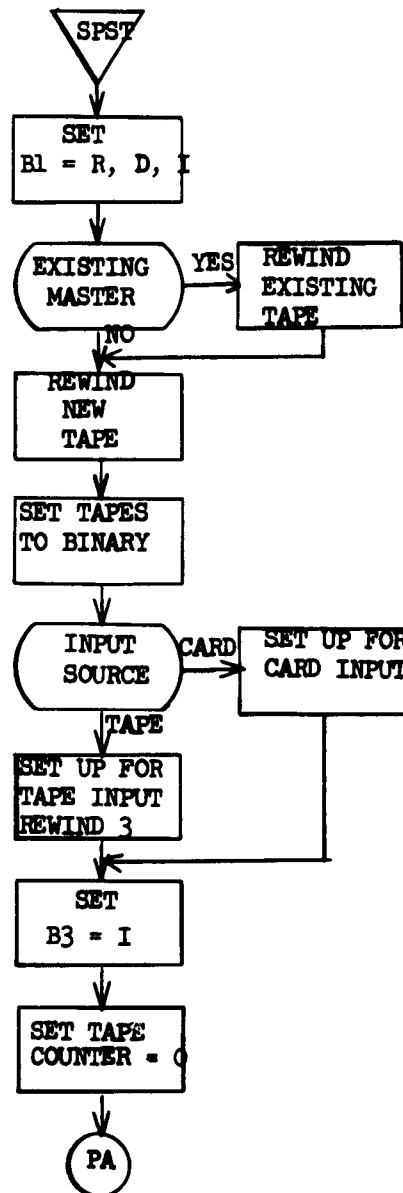
STORAGE REQUIRED

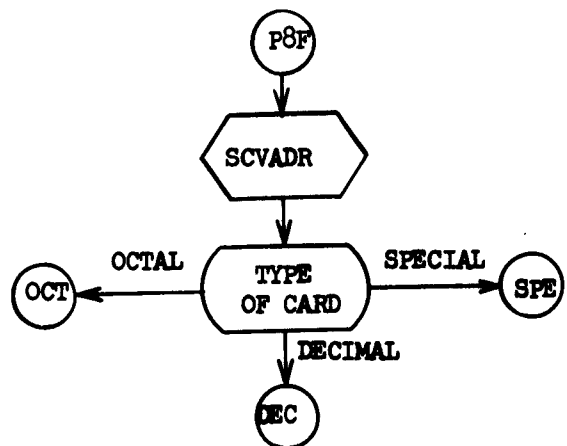
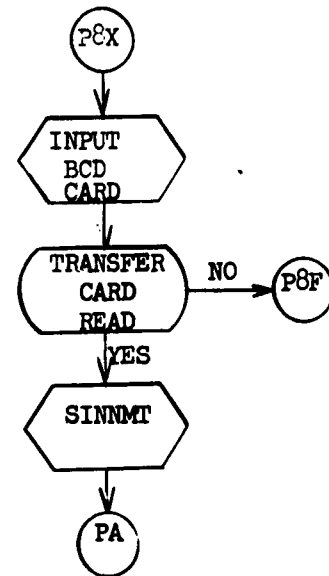
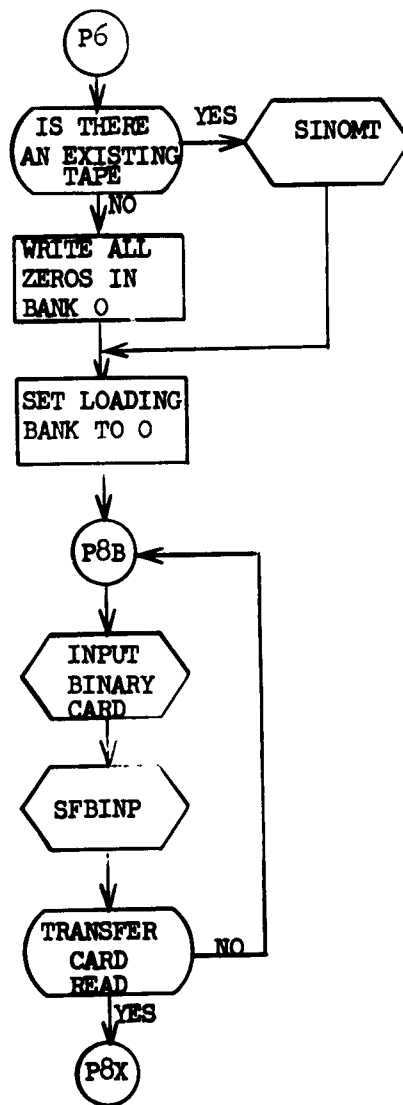
- A. Program - 2660_8 cells in bank 1 (100-2766)
- B. Tape Buffer - 7777_8 cells in bank 0 (0-7777)
- C. Card Buffer - 120_8 cells in bank 3 (7000-7120)
- D. Direct Cell - 21_8 cells in bank 1
- E. Symbol Table- 3776_8 cells in bank 1 (4000-7776)

Total: $17,026_8$ cells

VALIDATION TEST

SPST was validated by constructing operational Bird Buffer System tapes. The validity of the tapes was demonstrated by listing the contents of the tapes and by operating portions of the Bird Buffer System from the tapes. An additional test is shown in Appendix D.

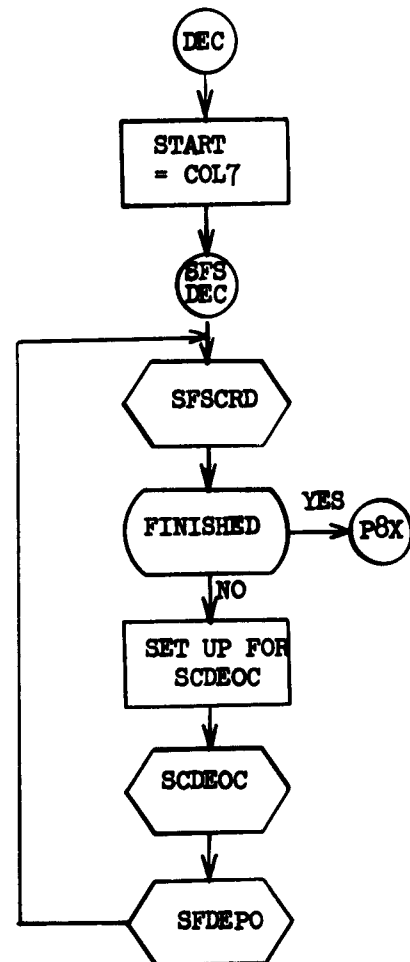
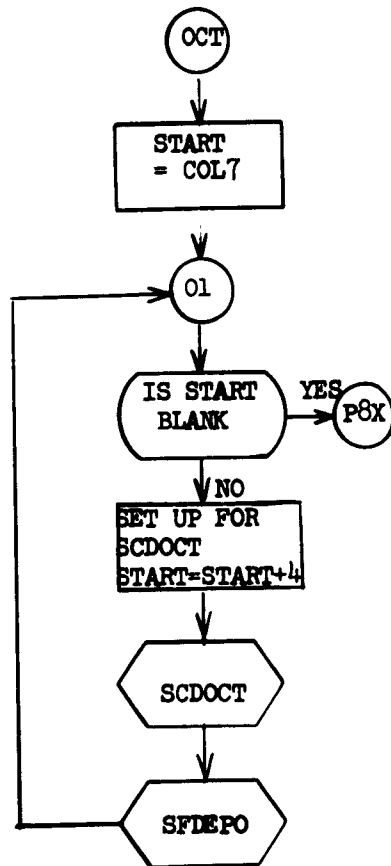


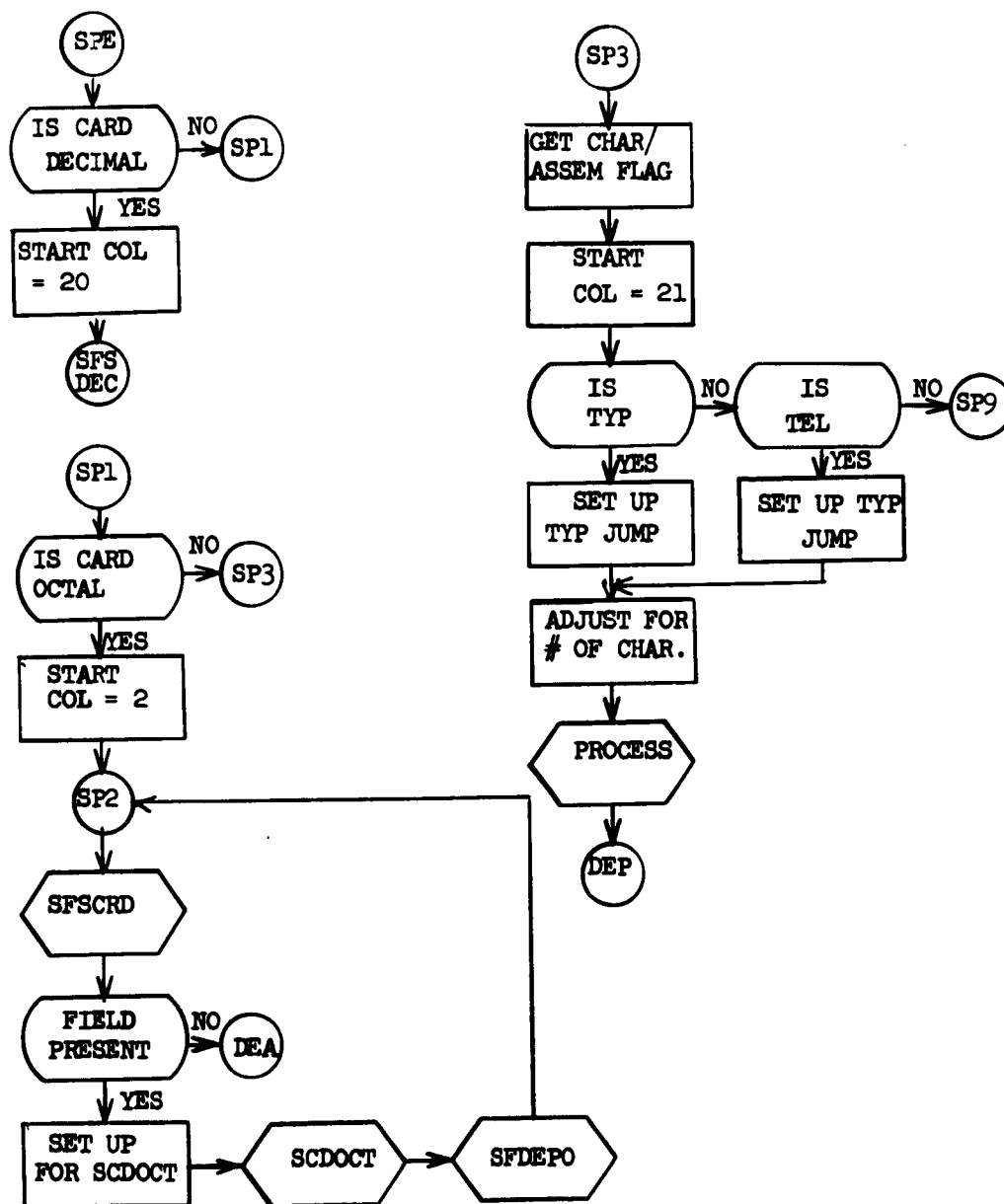


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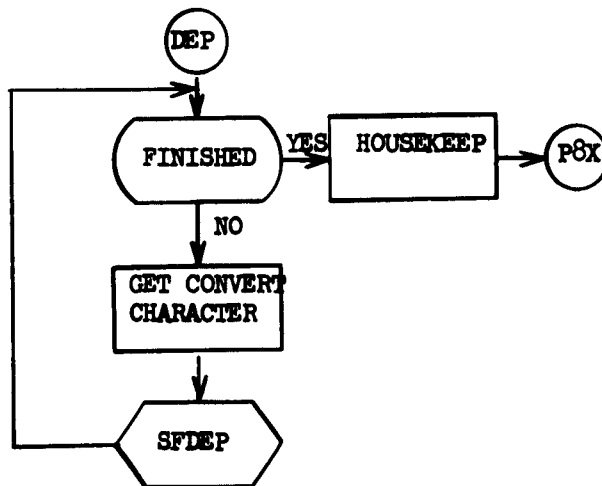
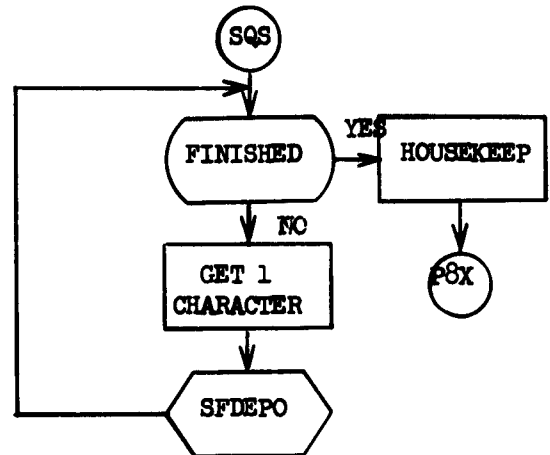
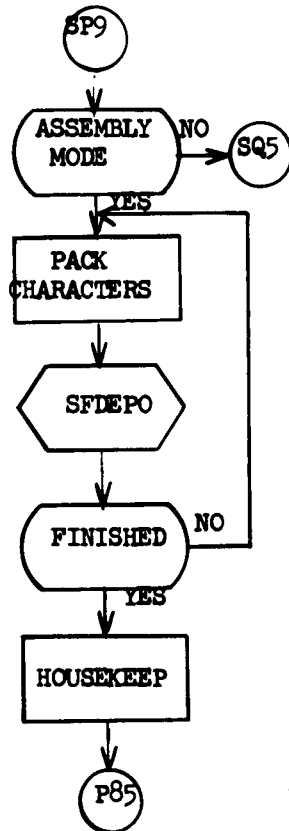




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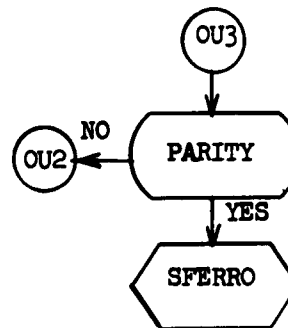
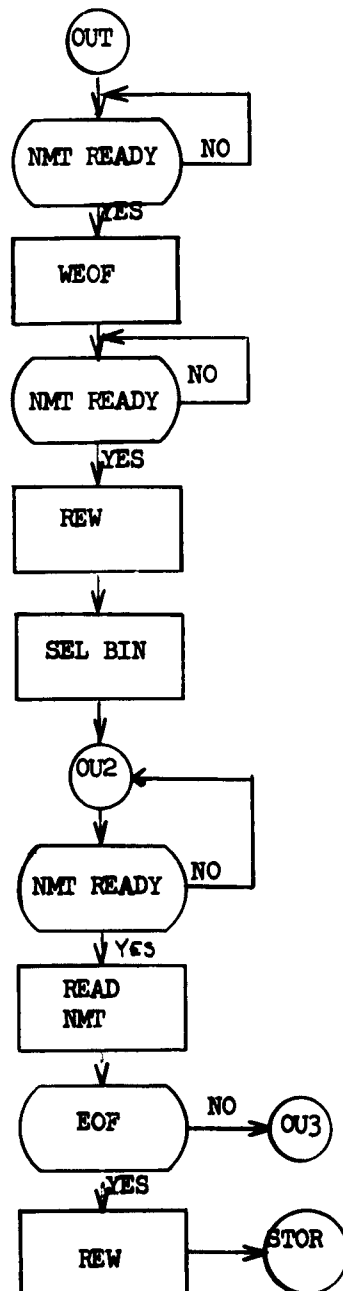
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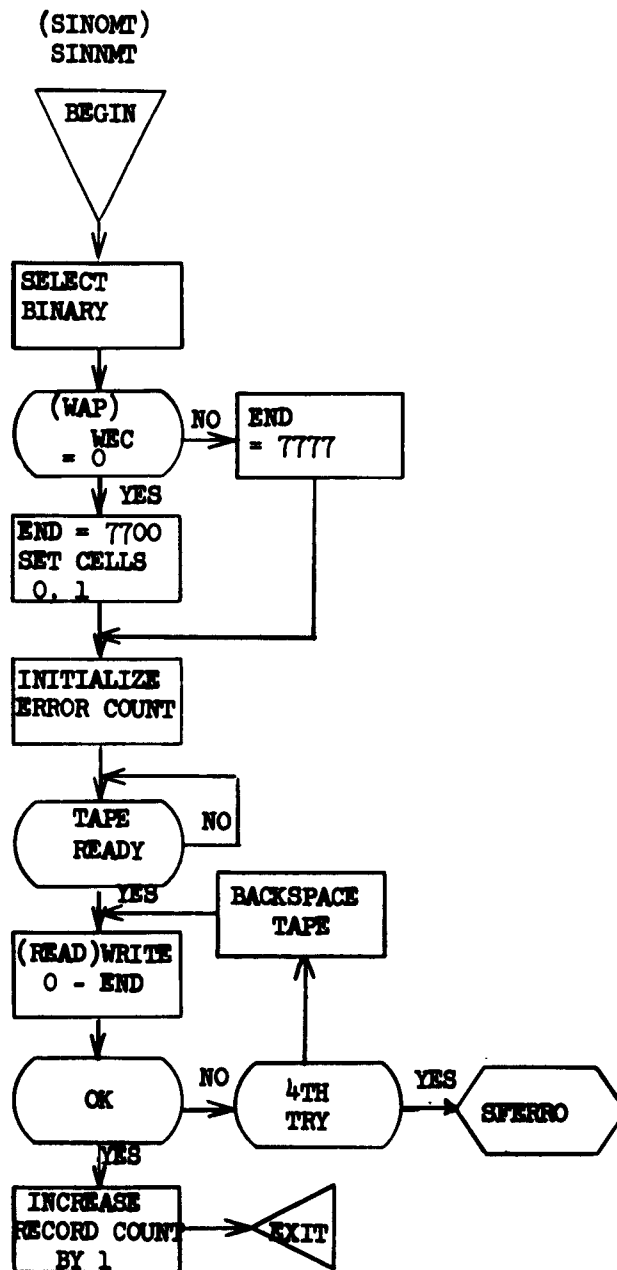
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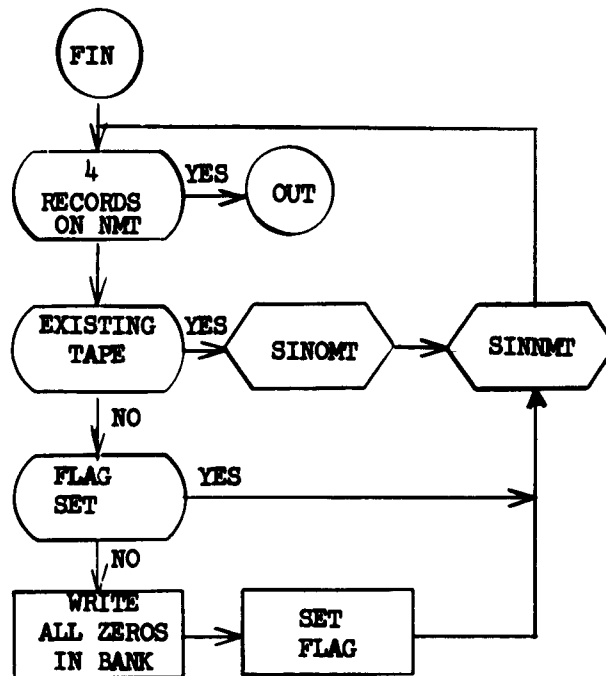
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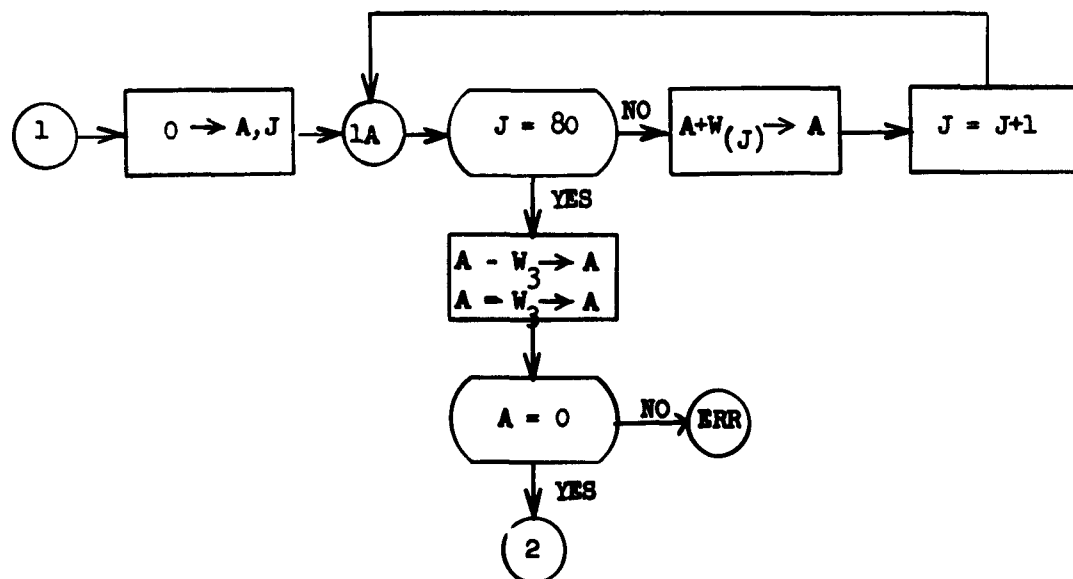
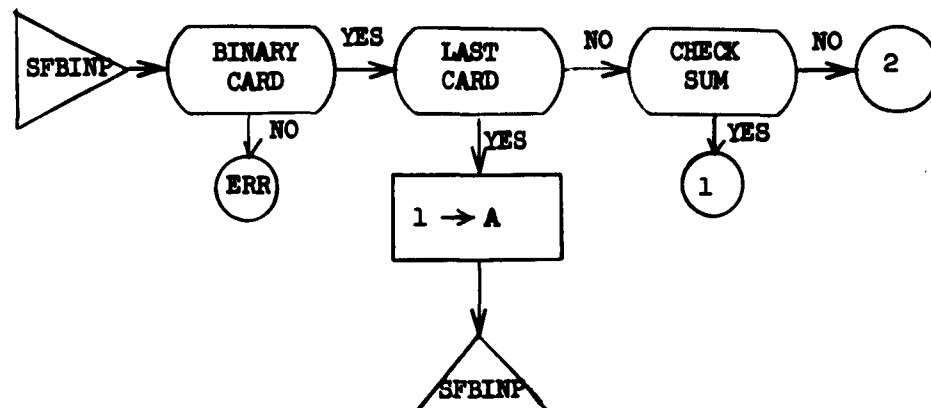
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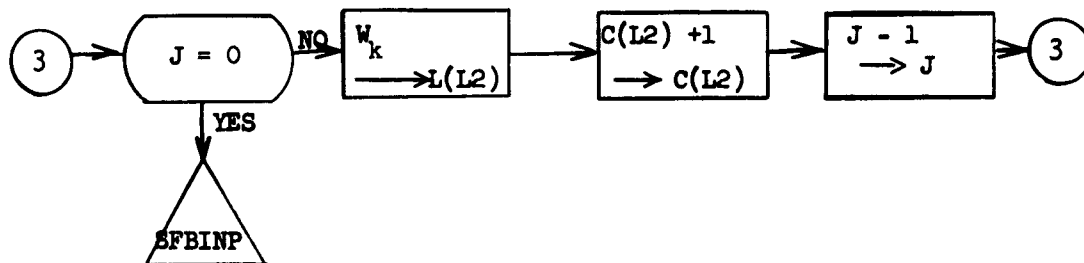
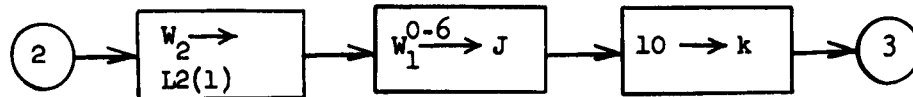
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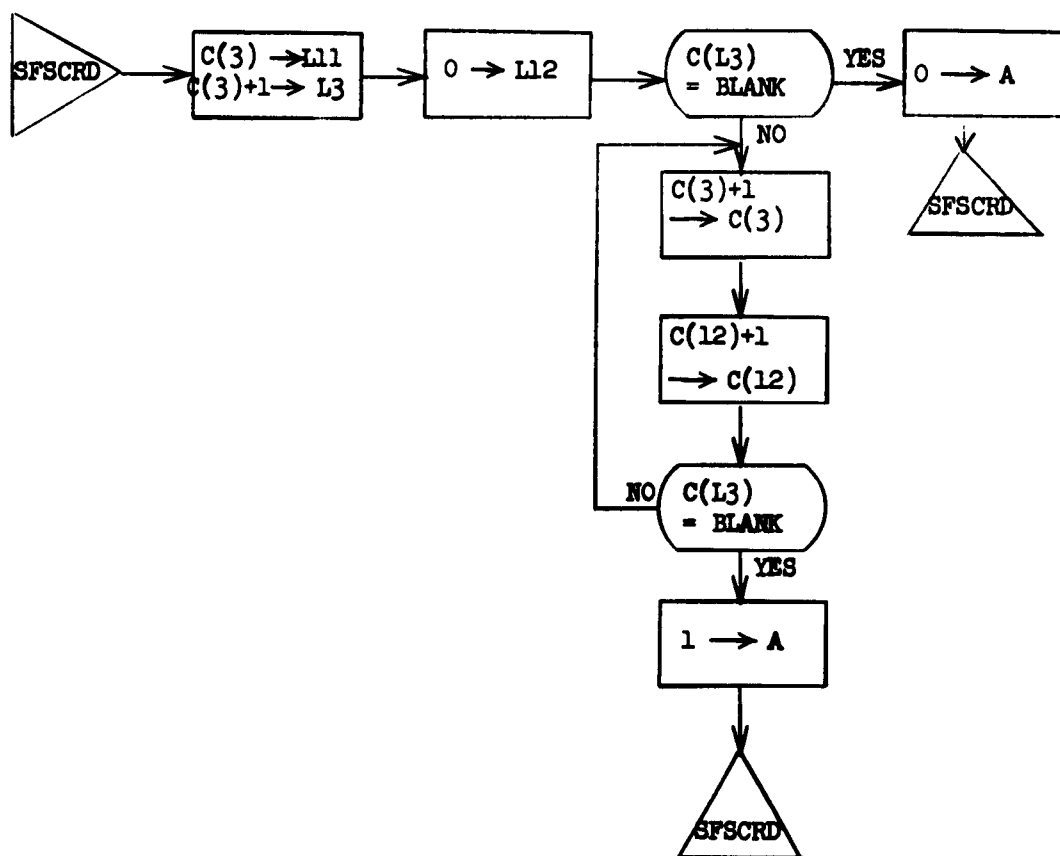
TM-1003/005/00

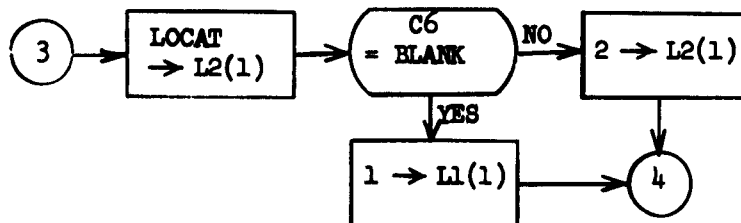
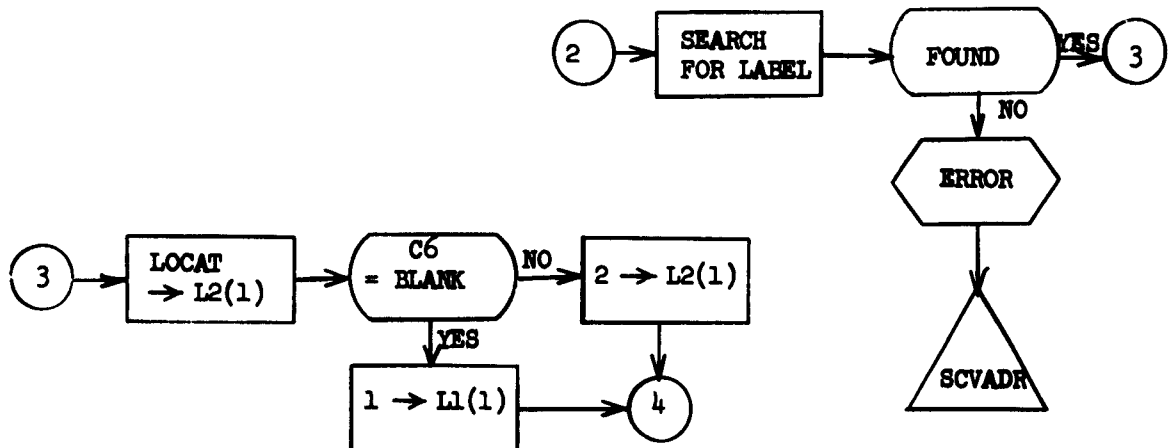
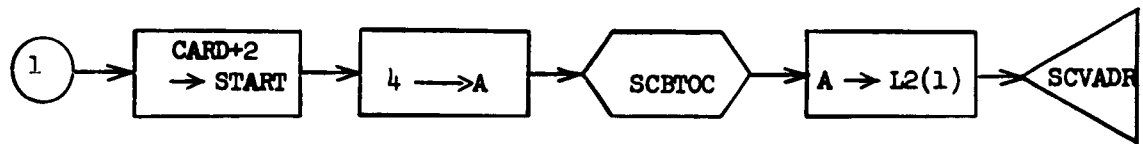
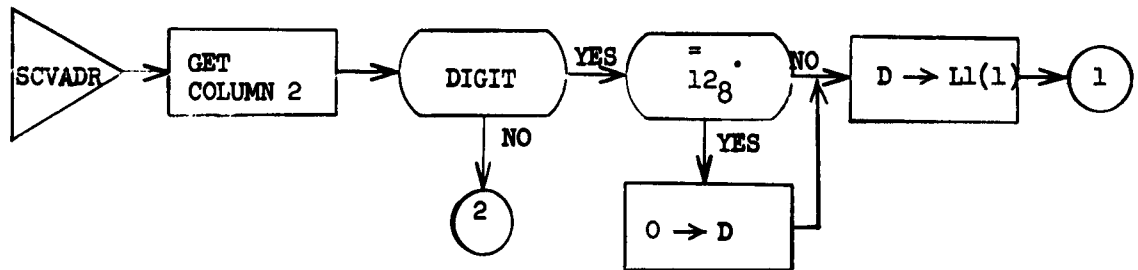


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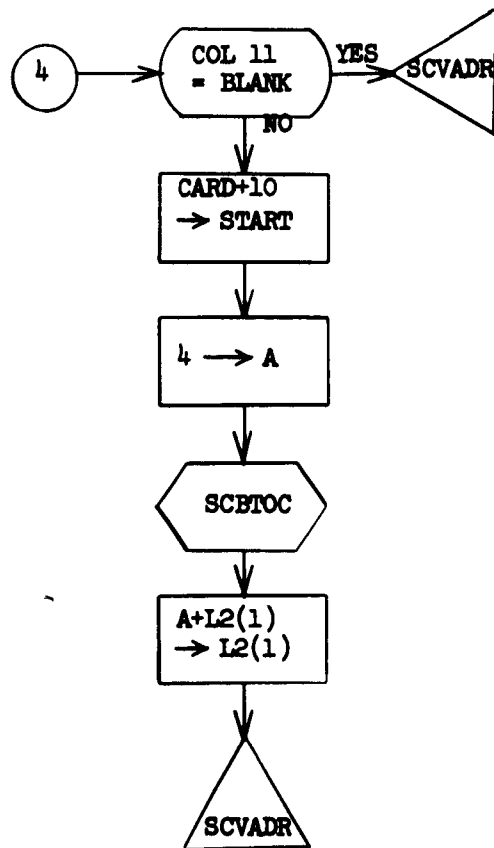




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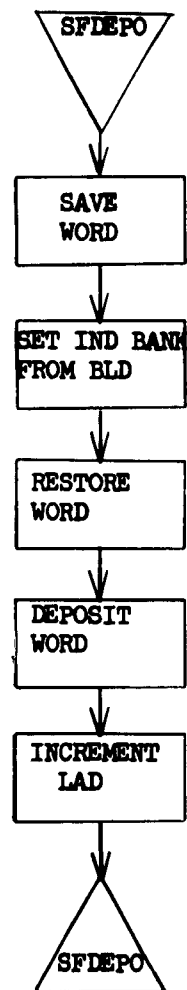
TM-1003/005/00

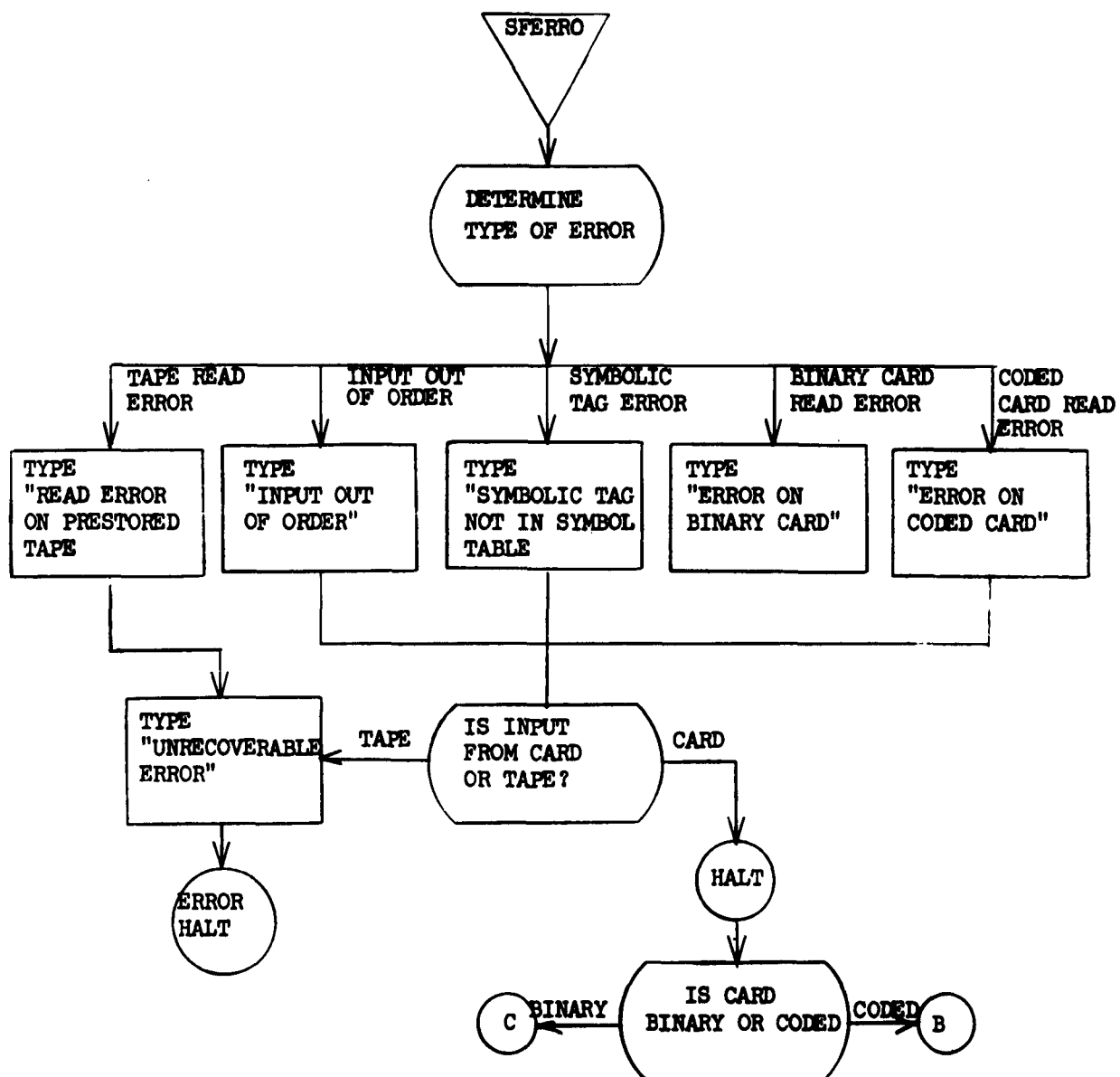


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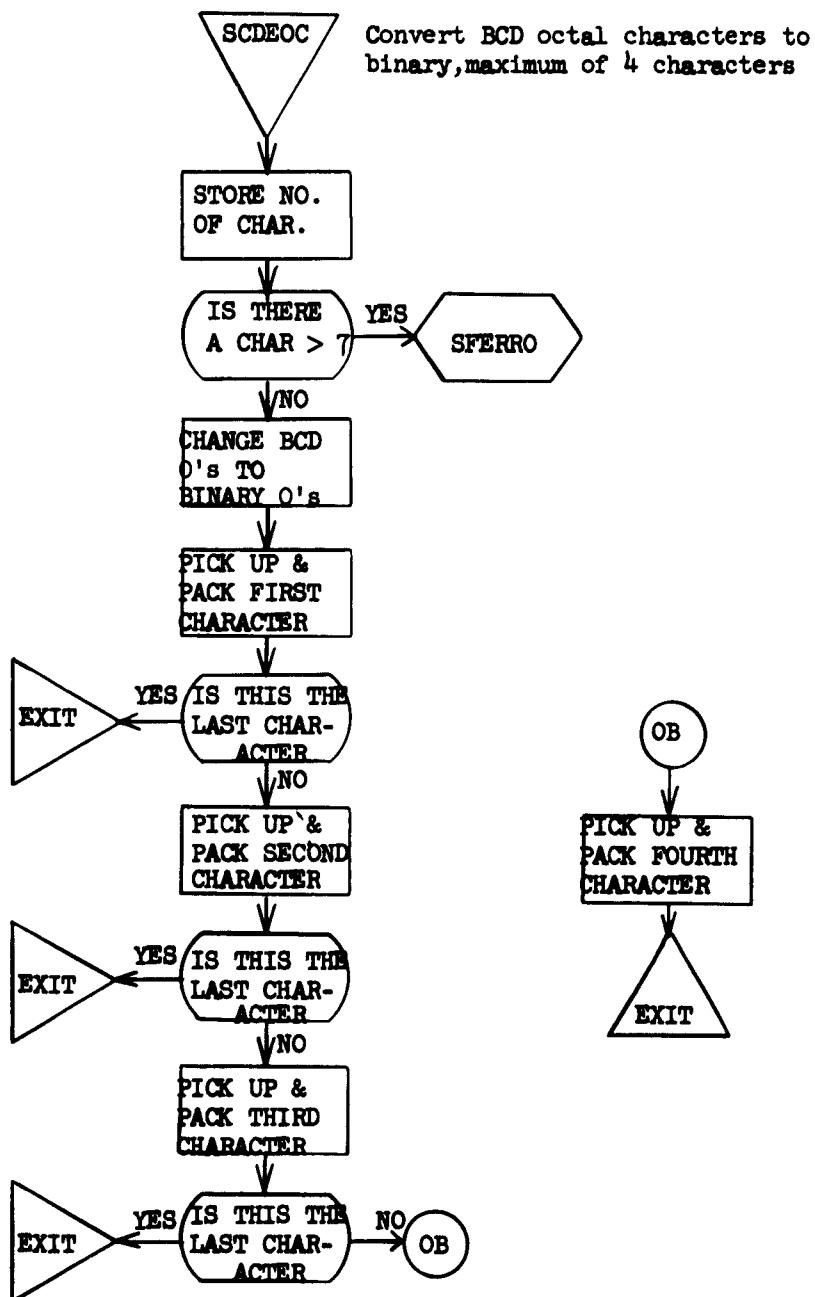




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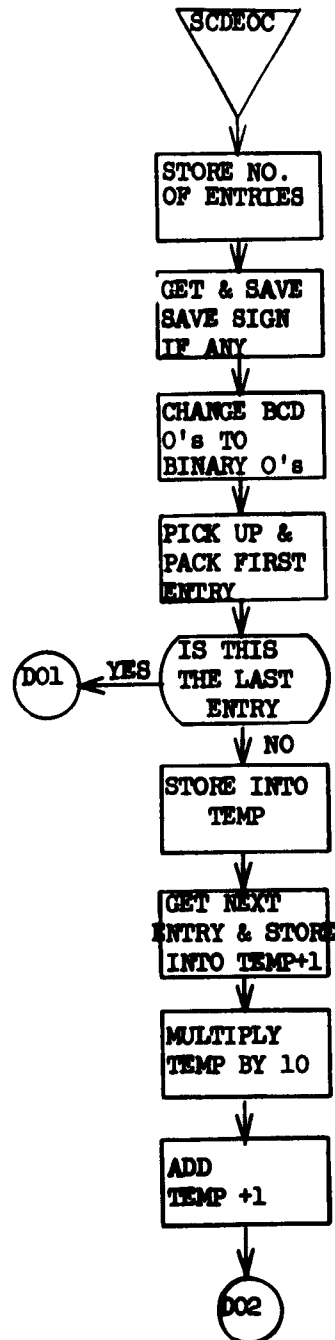
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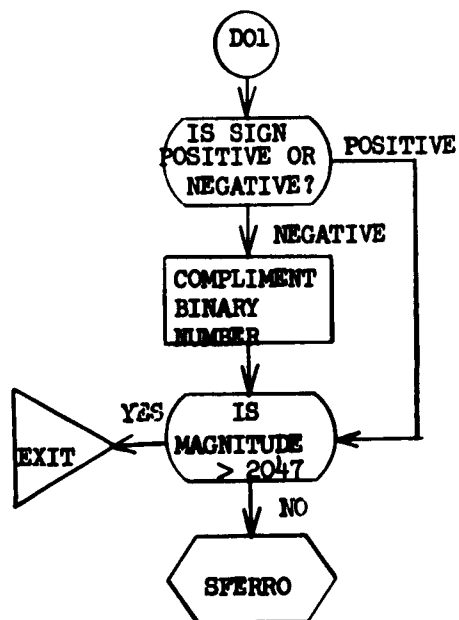


Convert BCD Decimal to 12
bit binary. Signed or un-
signed integers ≤ 2047

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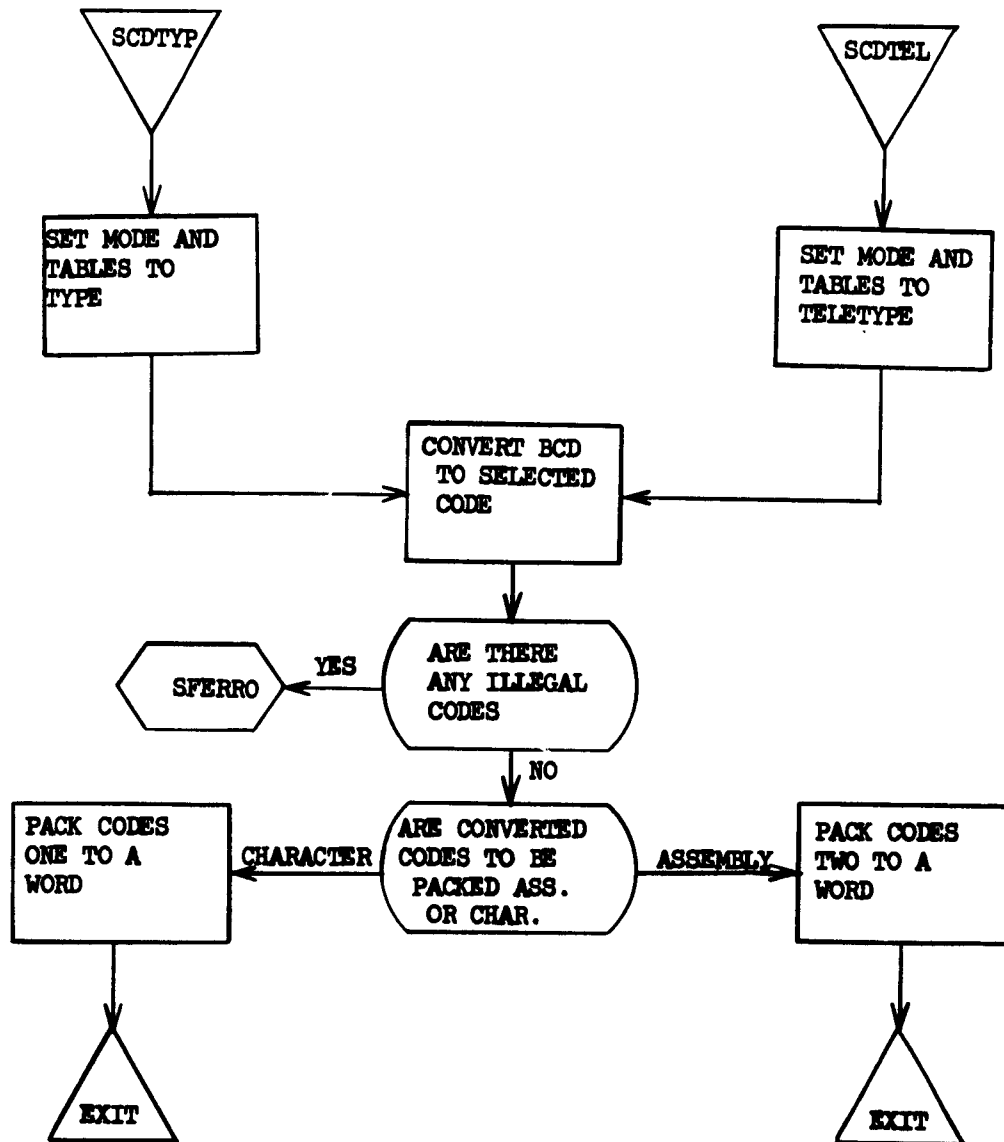
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APPENDIX A - CARD FORMATS

A. BINARY CARD

<u>Columns</u>	<u>Rows</u>	<u>Information</u>
1	7, 9, 12	Binary Card Indicators
1	8	If checksum is to be ignored
1	0 - 6	Word count
2		Starting address
3		Checksum of other 79 columns
4 - 9		Relocatable information (ignored by SCTL and SPST)
10 - 80		Binary information

B. BINARY TRANSFER CARD

<u>Columns</u>	<u>Rows</u>	<u>Information</u>
1	7, 9, 12	Binary Card Indicators
1	0 - 6	Word count = 0

Remainder of card ignored by SCTL and SPST.

C. BANK CARD

BANK in columns 1-4, logical bank selection in column 6. This card must precede binary decks as it indicates the loading bank.

D. CODED CORRECTIONS**1. Octal Card:**

Column 1	zero punch
Column 2	Bank selection (0, 1, 2 or 3)
Columns 3 - 6	Octal loading address
Columns 7 - 76	Octal entires

Up to 16 consecutive words may be on one card. No blank fields will be permitted between any of the entires.

2. Decimal Card:

Column 1	"D" punch
Column 2	Bank selection (0, 1, 2 or 3)
Columns 3 - 6	Octal loading address
Columns 7 - 78	Signed decimal entries
Columns 79 - 80	Blank

Only signed integers, no greater than 2047_{10} in magnitude, can be used.

Entries will be separated by one blank column.

Data will be terminated by two blanks.

3. Symbolic Card:

Column 1	"S" punch
Columns 2 - 7	A five or six character alpha-numeric tag left justified. If absolute addressing is desired, the bank

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selection will be in column 2 with the octal loading address in columns 3 - 6.

Columns 8 - 11

Octal additive left justified (used with symbolic addressing only).

Columns 15 - 17

Type of entry

DEC - signed decimal integer

OCT - unsigned octal

TYP - typewriter characters

BCD - BCD characters

TEL - teletype characters

Column 18

"R" punch if the TYP, BCD or TEL data is to be packed in character mode.

Columns 20 - 78

DEC - a blank will separate entries.

OCT - a blank will separate entries.

For TYP, BCD, and TEL. Starting in column 20, the number of words of data characters is followed immediately by the entries. Maximum of 9 words per card.

Columns 79 - 80

Blank

Numeric data will be terminated by two blanks.

E. CODED TRANSFER CARD

Column 1

A twelve and zero punch in column 1.

F. END CARD

Columns 10 - 12

END

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Column 20

Bank number

Columns 21 - 29

Starting address

The bank number and starting address are optional.

I

(

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G. SAMPLE CORRECTORS

013467001145671023

OCTAL CARD

D20013+3 -1096 +400 +0 -768

DECIMAL CARD

SALPHA 70 BCDR 6REJECT

S01367 DEC +6 +30 -10 +2047 -78

SYMBOLIC CARDS

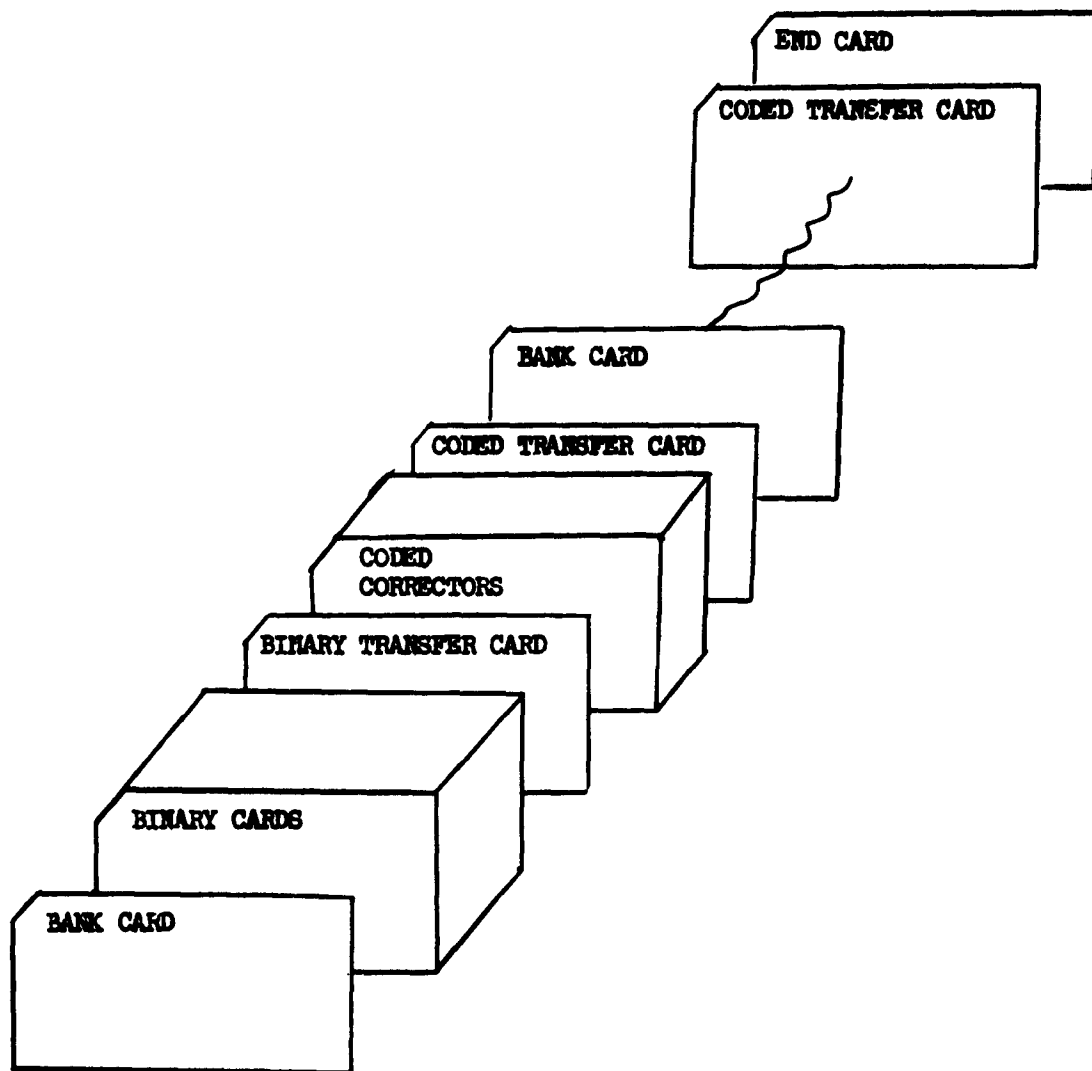
BGAMMA TYP 5HIT START

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APPENDIX B - INPUT DECK STRUCTURE



APPENDIX C - SYSTEM TAPE FORMAT

The system tape is a binary tape consisting of four records and ended by an end of file mark.

Record 1	loaded into Bank 0 from address 0_8 to 7700_8 .
Record 2	loaded into Bank 1 from address 0 to 7777_8 ; contains the loader and Symbol table.
Record 3	loaded into Bank 2 from address 0 to 7777_8 .
Record 4	loaded into Bank 3 from address 0 to 7777_8 .

All words which do not contain instructions or data are initialized to all zeros.

APPENDIX D

SAMPLE SPST RUN

The deck shown on the following page was input to SPST and a tape was produced. A listing of the tape is also included in this appendix.

Several items of interest concerning the listings are given below.

1. The tape was tapedumped on the 1604 and, therefore, the format of the dump is the 1604 format.
2. The first record of the dump has each character shifted two positions to the right.
3. The binary deck has an assembly error, which causes location 104_8 to be 7777_8 rather than 5639_{10} .
4. The decimal card has an error which causes cell 20_8 to be set to 0642_8 , rather than 0000.
5. Cell 4096 is not changed by SPST; in the listing, it is 0260_8 .
6. The symbol SCOMA is equated to 200_8 in the symbol table used for this run.

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INPUT DECK

BANK 0

BINARY DECK AND TRANSFER CARD

0000500001001001001000001101101100011111101111

SSCOMA 1 OCT 7771

SSCOMA DEC -2047

0000050005000607654321

SSCOMA 20 TEL 2ABCD

SSCOMA 2 TYP 2ABCD

SSCOMA 17 BCDR 4ABCD

D00011+1 2 +3 -1 +9 +99 -17 00

D000220 8 1 7 2 9 1 12 23 34 56 78 89

0

BANK 1

BINARY DECK AND TRANSFER CARD

0000000001000212345670

SSCOMA 20 TEL 2ABCD

SSCOMA 17 BCDR 4ABCD

SSCOMA 2 TYP 2ABCD

0000050005000607654321

SSCOMA DEC -2047

D000220 8 1 7 2 9 1 12 23 34 56 78 89

SSCOMA 1 OCT 7771

D00011+1 2 +3 -1 +9 +99 -17 00

0

BANK 2

BINARY DECK AND TRANSFER CARD

D000220 8 1 7 2 9 1 12 23 34 56 78 89

0000000001000212345670

SSCOMA 2 TYP 2ABCD

SSCOMA 17 BCDR 4ABCD

D00011+1 2 +3 -1 +9 +99 -17 00

0000500001001001001000001101101100011111101111

SSCOMA 1 OCT 7771

SSCOMA 20 TEL 2ABCD

SSCOMA DEC -2047

0000050005000607654321

0

BANK 3

BINARY DECK AND TRANSFER CARD

0000500001001001001000001101101100011111101111

SSCOMA 20 TEL 2ABCD

SSCOMA 17 BCDR 4ABCD

SSCOMA 2 TYP 2ABCD

0000000001000212345670

D00011+1 2 +3 -1 +9 +99 -17 00

D000220 8 1 7 2 9 1 12 23 34 56 78 89

SSCOMA 1 OCT 7771

SSCOMA DEC -2047

0000050005000607654321

0

END

BINARY DECK CONTENTS

	0100	ORG	100	
0000 0	1111		1111	101
0001 1	2222		2222	102
0010 2	3333		3333	103
0011 3	4455		4455	104
U 0012 4	7777		5639	105
	0111	ORG	111	111
0013 1	1010		1010	111
0014 2	0101		101	112
0015 3	1100		1100	113
0016 4	0011		11	114
0017 5	1001		1001	115
0018 6	0110		110	116
0019 7	7070		7070	117
0020 0	0770		770	120
0021 1	7007		7007	121
0022 2	0707		707	122
0023 3	7700		7700	123
0024 4	0077		77	124
	0000	END		

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TAPEDUMP OF SPST TAPE

TAPEDUMP 12 13 1 0 0									
TAPE	12041	PRINT	00001	FILES	PRINT	00000	RECORDS	SKIP	00000
FILE NO.	00001								
RECORD NO. 00001 01/61(OCTAL) WORDS									
00000	01 7 1017	00 0 0000	00 0 0000	05 0 0007	65 4 32100	01 0 00200	03 7 77600	11 3 14377	
00004	56 0 6420	00 0 0000	10 0 00100	07 0 00200	11 0 00100	14 0 02700	42 0 07001	16 0 13100	
00010	00 0 0000	00 0 0000	00 0 00000	00 0 00000	00 0 00100	10 0 10010	00 0 01101	10 1 10001	
00014	11 1 11011	11 0 0000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
00020	00 1 11122	22 3 33344	55 7 77700	00 0 00000	00 0 00010	10 0 10111	00 0 01110	01 0 11070	
00024	70 0 77077	07 0 70777	00 0 07700	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
WORDS 00030 THROUGH 00037 CONTAIN 00 0 00000 00 0 00000									
00040	00 4 00077	71 3 02316	22 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
00044	61 0 00200	63 0 06400	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
WORDS 00050 THROUGH 01760 CONTAIN 00 0 00000 00 0 00000									
RECORD NO. 00002 02000(OCTAL) WORDS									
00000	00 0 10002	12 3 45670	00 0 00005	00 0 60765	43 2 10001	00 0 20003	77 7 60011	01 4 37756	
00004	06 4 20000	00 0 00010	00 0 10007	00 0 20011	00 0 10014	00 2 70042	00 7 00116	01 3 10000	
WORDS 00010 THROUGH 00017 CONTAIN 00 0 00000 00 0 00000									
00020	11 1 12222	33 3 34455	77 7 70000	00 0 00000	00 0 01010	01 0 11100	00 1 11001	01 1 07070	
00024	07 7 07007	07 0 77700	00 7 70000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
WORDS 00030 THROUGH 00037 CONTAIN 00 0 00000 00 0 00000									
00040	40 0 07771	30 2 31622	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
00044	00 6 20063	00 6 40000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
WORDS 00050 THROUGH 01776 CONTAIN 00 0 00000 00 0 00000									
01777	00 0 00000	02 6 00000							
RECORD NO. 00003 02000(OCTAL) WORDS									
00000	00 0 10002	12 3 45670	00 0 00005	00 0 60765	43 2 10001	00 0 20003	77 7 60011	01 4 37756	
00004	06 4 20000	00 0 00010	00 0 10007	00 0 20011	00 0 10014	00 2 70042	00 7 00116	01 3 10000	
00010	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 10010	01 0 01000	00 1 10110	11 0 00111	
00014	11 1 01111	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	
00020	11 1 12222	33 3 34455	77 7 70000	00 0 00000	00 0 01010	01 0 11100	00 1 11001	01 1 07070	
00024	07 7 07007	07 0 77700	00 7 70000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	00 0 00000	

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System Development Corporation,
Santa Monica, California
MILESTONE 11 PREPARE BIRD BUFFER SYSTEM
TAPE (SPST).
Scientific rept., TM-1003/005/00, by
R. C. Wise. 10 March 1963, 35p.
(Contract AF 19(628)-1648, Space Systems
Division Program, for Space Systems Division,
AFSC)

Unclassified report

DESCRIPTORS: Programming (Computers).
Satellite Networks.

States that the Prepare System Tape
program (SPST) will initially generate UNCLASSIFIED

a Bird Buffer System tape from a
specially formatted input deck,
or subsequently edit any part
of an existing system tape. Reports
that SPST was validated by constructing
operational Bird Buffer System tapes.

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